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COMMONWEALTH OF AUSTRALIA

19,705/62

## PATENT SPECIFICATION

Complete Specification Lodged ..... 3rd July, 1963.

Application Lodged (No. 19,705/62) ..... 6th July, 1962.

Applicant ..... Industrial Products Limited.

Actual Inventors ..... Charles Rothauser and Bruce Russell Thompson.

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Classification 22. 4; 57. 5.

International Classification F 06 k; B 67 b.

Drawing attached.

## COMPLETE SPECIFICATION.

## AN IMPROVED CAP FOR CONTAINERS FOR GASEOUS FLUIDS.

The following statement is a full description of the invention, including the best method of performing it known to us:-

This invention relates to an improved cap for containers for gaseous fluids and in particular it relates to a cap which can be used for fluids where pressure is likely to be generated in the containers which could burst the containers or cause other trouble if not released.

The object of this invention is to provide a simple and effective cap which will allow excessive pressure to be released.

According to this invention, a cap for a container including a depending stem, a flexible sealing diaphragm in the cap movable over the depending stem, and a pressure relief vent in the cap, whereby fluid when at pressure within a container to which the cap is secured moves the diaphragm over the depending stem thereby allowing said fluid to pass outwardly from the container, past the diaphragm and through the pressure relief vent.

The cap according to this invention is of relatively simple construction and the diaphragm is either pierced or is pierceable (in which case the depending stem can conveniently consist of a spike) and which forms part of the cap so that for normal purposes the diaphragm will seal the container when the cap is in place thereon but when the pressure in the container rises to a predetermined value the diaphragm will either be pierced by the depending stem or will be distorted over the stem to allow the content to escape until a safe pressure is again reached.

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Embodiments of the invention are described hereunder in some detail with reference to and are illustrated in the accompanying drawings, in which:-

Fig. 1 is an "exploded" sectional view of a cap according to a first embodiment,

Fig. 2 is a perspective view of Fig. 1, but showing the cap in its assembled state,

and

Fig. 3 is a sectional view of a cap according to a second embodiment.

According to the first embodiment of Figs. 1 and 2, a cap 10 comprises an outer ring-shaped member 11 which is adapted to screw on to a container, and is provided with finger grips 12 to facilitate screwing.

Within the cap 10 is housed a diaphragm 14 which is so shaped that it extends across the inner surface of the cap 10 and forms a seal between the cap 10 and the container to which it is to be secured.

The diaphragm 14 has an annular recess 15 which engages over an out-turned flange of a domed centre member 16 which engages and depends from the ring-shaped member 11 (although it can, if desired, form an integral part therewith), this domed member 16 having within it a central depending stem 17 which in this embodiment is a spike and which is positioned adjacent to the diaphragm with its point almost engaged by the diaphragm or just piercing the diaphragm, this stem 17 thus serving as a member which will cause piercing of the diaphragm when the diaphragm is upwardly or outwardly deflected to allow gases to escape or in the case where it has already pierced the diaphragm it will allow the diaphragm to distort so that pressure can be vented past the edges of the piercer and can leave the cap through vents 18 in the domed member.

A cap 19 according to a second embodiment is shown in Fig. 3, wherein the diaphragm 20 engages over a stem 21 which has on its lower end a boss 22 to retain the diaphragm 20. The aperture in the diaphragm 20 is an interference fit over the stem 21, so that a seal normally exists therebetween. When, however, pressure is applied to the diaphragm 20, it moves over the stem 21 and "bellmouths" as shown by the dotted lines, and the fluid can then leave the cap 19 through the vents 24.

By either construction the resilient sealing diaphragm is firmly locked in position within the cap and serves the dual purpose of making a seal with the opening of the container on to which the cap is screwed or otherwise held but also allowing venting of the container at appropriate times.

The claims defining the invention are as follows:-

1. A cap for a container including a depending stem, a flexible sealing diaphragm in the cap movable over the depending stem, and a pressure relief vent in the cap, whereby fluid when at pressure within a container to which the cap is secured moves the diaphragm over the depending stem thereby allowing said fluid to pass outwardly from the container, past the diaphragm and through the pressure relief vent. (6th July, 1962).

2. A cap for a container including an outer ring-shaped member, a centre member upstanding from the outer ring-shaped member, a stem depending from the centre member, a flexible sealing diaphragm in the cap movable over the depending stem, and a pressure relief vent in the centre member, whereby fluid when at pressure within a container to which the cap is secured moves the diaphragm over the depending stem thereby allowing said fluid to pass outwardly from the container, past the diaphragm and through the pressure relief vent. (6th July, 1962).

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3. A cap for a container including a depending spike-shaped stem, a flexible sealing diaphragm in the cap disposed beneath the depending stem, and a pressure relief vent in the cap, whereby fluid when at pressure within a container to which the cap is secured moves the diaphragm over the depending spike-shaped stem to be pierced thereby, thus allowing said fluid to pass outwardly from the container, past the diaphragm and through the pressure relief vent. (6th July, 1962).

4. A cap for a container including an outer ring-shaped member, a centre member projecting from the ring-shaped member, a pressure relief vent in the centre member, a diaphragm, and a central spike-shaped stem depending from the centre member and terminating adjacent the diaphragm, whereby fluid when at pressure within a container to which the cap is secured moves the diaphragm over the spike-shaped stem to be pierced thereby, thus allowing said fluid to pass outwardly from the container, past the diaphragm and through the pressure relief vent. (6th July, 1962).

5. A cap for a container including an outer ring-shaped member adapted to screw on to a container, a centre member engaging and projecting from the ring-shaped member, a pressure relief vent in the centre member, an out-turned flange on the centre member, a diaphragm, an annular recess in the diaphragm engaging over the out-turned flange, and a central spike-shaped stem depending from the centre member and terminating adjacent the diaphragm, whereby fluid when at pressure within a container to which the cap is secured moves the diaphragm over the spike-shaped stem to be pierced thereby, thus allowing said fluid to pass outwardly from the container, past the diaphragm and through the pressure relief vent. (6th July, 1962).

6. A cap for a container including a pressure relief vent, a central depending stem, a boss on the lower end of the central stem, a diaphragm, and a central aperture in the diaphragm, the walls defining the central aperture sealably engaging the central stem, whereby fluid when at pressure within a container to which the cap is secured moves the diaphragm over the stem thus allowing said fluid to pass outwardly from the container, past the diaphragm and through the pressure relief vent. (6th July, 1962).

7. A cap for a container including an outer ring-shaped member, a centre member integral with and upstanding from the ring-shaped member, a pressure relief vent in the centre member, a stem depending from the centre member, a boss on the lower end of the central stem, a diaphragm, and a central aperture in the diaphragm, the walls defining the central aperture sealably engaging the stem, and the diaphragm being retained on the stem by the boss, whereby fluid when at pressure within a container to which the cap is secured moves the diaphragm over the stem thus allowing said fluid to pass outwardly from the container, past the diaphragm and through the pressure relief vent. (6th July, 1962).

8. A cap for a container including an outer ring-shaped member adapted to screw on to a container, a centre member integral with an upstanding from the ring-shaped member, a pressure relief vent in the centre member, a central stem depending from the centre member, a boss on the lower end of the central stem, a diaphragm, and a central aperture in the diaphragm, the walls defining the central aperture sealably engaging the central stem, whereby fluid when at pressure within a container to which the cap is secured moves the diaphragm over

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the stem thus allowing said fluid to pass outwardly from the container, past the diaphragm and through the pressure relief vent. (6th July, 1962).

9. A cap for a container constructed substantially according to the embodiment described in the specification with reference to and as illustrated in Figs. 1 and 2 of the accompanying drawings. (6th July, 1962).

10. A cap for a container constructed substantially according to the embodiment described in the specification with reference to and as illustrated in Fig. 3 of the accompanying drawings. (6th July, 1962).

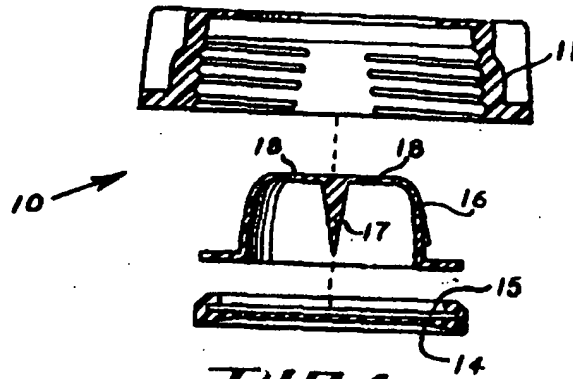
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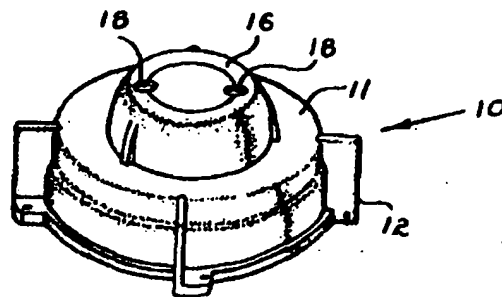
**Related Art:**

<b><u>Serial No.</u></b>	<b><u>Application No.</u></b>	<b><u>Classification.</u></b>
	16,019/15	22.4
	16,427/09	22.4
	7,786/61	22.4.

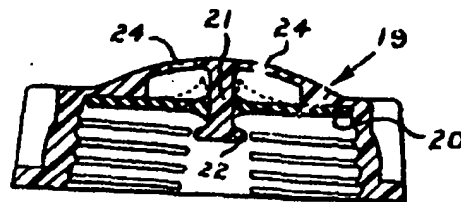
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**FIG 1**



**FIG 2**



**FIG 3**